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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/753,722	01/04/2001	Shingo Iwasaki	041514-5103	2640

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EXAMINER

BAUMEISTER, BRADLEY W

ART UNIT PAPER NUMBER

2815

DATE MAILED: 01/24/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.
09/753,722

Applicant(s)
Iwasaki et al.

Examiner
B. William Baumeister

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136 (a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on Nov 13, 2002
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11; 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-50 is/are pending in the application.
- 4a) Of the above, claim(s) 6, 8, 15-29, 35, 37, and 44-46 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-5, 7, 9-14, 30-34, 36, 38-43, and 47-50 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claims _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgement is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
a) ☐ All b) ☐ Some* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
*See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgement is made of a claim for domestic priority under 35 U.S.C. § 119(e).
a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgement is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892) 4) ☐ Interview Summary (PTO-413) Paper No(s). _____
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948) 5) ☐ Notice of Informal Patent Application (PTO-152)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s). _____ 6) ☐ Other:

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DETAILED ACTION

Claim Rejections - 35 U.S.C. § 103

1. The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

2. Claims 1-5, 7, 9-14, 30-34, 36, 38-43, and 47-50 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kaneko et al. '605 in view of EP '533.

a. Kaneko teaches MIM electron emitting devices having an electron source 1; an insulating layer 2 having a recess or island; and a metal thin film such as Au 3 formed thereover. Note particularly, (1) PRIOR ART FIG 2 wherein the SiO₂ insulating layer 54 is recessed inward and Au layer 55 is reduced on the sidewall (claim 9); (2) FIGs 4A/B wherein insulating layer 2 has a thickness of 50-200 angstroms in the recessed region and a thickness of 2000-5000 angstroms in the other regions (claim 11); FIG 5B wherein the metal 3 is terminated on the insulating layer 2 (claim 12); and (4) FIG 8 wherein the SiO₂ insulating layer 11 terminates on the underlying Si electron supply layer 10 (claim 13). Kaneko does not disclose the additional feature of a carbon region on at least one of a top, bottom and inside of the island region, as recited in claims 1 and 30.

b. EP '533 teaches a display apparatus including a pair of spaced substrates with a vacuum therebetween, a plurality of electron-emitting devices provided on the first substrate; a collector electrode provided on an interior surface of the second substrate with a phosphor layer

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and wherein the electron emission devices have an electron supply (source) layer 12; an insulating layer 13; and a thin film metal electrode 15 which may be composed of Au. In the embodiment of FIG 26, an intermediate layer 14 having a work function which is lower than that of said thin-film metal electrode 15 is interposed between the insulating layer 13 and the metal thin film 15. See page 16, lines 20-25 wherein the reference teaches that this layer may be composed of C or ZrC. The Embodiment of FIG 34 also teaches that the low-work function material may be formed dispersed within the metal electrode 15.

c. It would have been obvious to one of ordinary skill in the art at the time of the invention to have employed the C-compound low work function material in the electron-emitter device of Kaneko--either as an interposed layer or alternatively by being dispersed within the metal thin film--for the purpose of facilitating the transfer of electrons from the insulator to the thin-film metal layer and thereby improving the device's stability and performance as taught by EP '533 (page 17, lines 26 and 58).

d. For clarification, the examiner notes that claim 10 reads at least on FIG 2 of Kaneko when modified so as to include interspersed low work function material as taught by EP 533.

e. Regarding claim 30 and its dependent claims, regardless of whether Kaneko expressly recites or implies the rest of the conventional features (e.g., vacuum, collector, phosphor), these elements are all taught by EP '533 and it would have been obvious to one of

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ordinary skill in the art at the time of the invention to have employed them in conjunction with the Kaneko electron emitter for the purpose of providing a three-color display as taught by EP '533.

f. Newly added claims 47 and 49 further set forth that the island region defines a concave recess portion. The examiner notes that the definition of "concave" is not limited to curved surface, but also includes polygonal shapes having at least one angle greater than 180 degrees. (See Webster's Dictionary, page 303, definition #2). As such, the Kaneko recess is "concave" under the broadest reasonable interpretation.

g. Newly added claims 48 and 50 further set forth that at least one of the carbon region and the metal thin film is gradually reduced. As was explained previously and reprinted hereinabove, in the PRIOR ART FIG 2, the SiO₂ insulating layer 54 is recessed inward and Au layer 55 is reduced on the sidewall: i.e., is gradually reduced in the island region relative to the adjacent planar region.

Response to Arguments

3. Applicant's arguments filed 11/13/2002 have been fully considered but they are not persuasive. Applicant argues that the insulating layer 54 in FIG 2 of the Kaneko drops off sharply as opposed to being gradually reduced (REMARKS page 4). This is not persuasive because no objective standard is set forth for how gradual the taper must be in order to be deemed "gradually reduced." In fact, Applicant states in the specification that the insulating layer 13 formed with the reverse taper block in FIGs 19-22 is also "gradually reduced" (e.g., specification, page 31, first

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full paragraph at the middle of the page). As Applicant defines “gradually reduced” to include this structure, the recessed insulating layer of Kaneko is as “gradually reduced” as is required by the claims.

Conclusion

4. Applicant's amendment necessitated the/any new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a).

Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the date of this final action.

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INFORMATION ON HOW TO CONTACT THE USPTO

5. Any inquiry concerning this communication or earlier communications from the examiner should be directed to the examiner, **B. William Baumeister**, at (703) 306-9165. The examiner can normally be reached Monday through Friday, 8:30 a.m. to 5:00 p.m. If the Examiner is not available, the Examiner's supervisor, Mr. Eddie Lee, can be reached at (703) 308-1690. Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the Group receptionist whose telephone number is (703) 308-0956.

A handwritten signature in black ink, appearing to read 'B. William Baumeister', with a stylized, sweeping flourish at the end.

B. William Baumeister

Patent Examiner, Art Unit 2815

January 23, 2003